Claims

1. (original) A method for code-tracking CDMA communication systems comprising:

(a) receiving of an electromagnetic signal (10) being a superposition of a plurality signal components of different signal paths (i),

(b) digitizing (14) the received signal (10,13),

(c) distributing the digitised signal (15) to receiver fingers (1, 2, ... N) each of which is assigned to one of the signal paths,

(d) distributing the digitised signal (110, 111) to a detection stream and a synchronizing stream,

(e) decorrelating (121, 122) the digitised signal by a code sequence (112) in the synchronisation stream and

(f) reducing the interference of at least one other ($j \neq i$) than the signal component of the assigned signal path (i) with the signal component the assigned signal path (i) in at least one of the receiver fingers.

2. (original) A method according to claim 1, wherein step (f) comprises a subtraction (130) of an interference signal from the decorrelated digitised signal (116).

3. (original) A method according to claims 1 or 2 wherein the subtraction takes place on symbol rate (1/T).

4. (original) A method according to one of the preceding claims, wherein interference of other signal components ($j \neq i$) than the assigned signal component (i) is reduced in all receiver fingers (1, 2, ... N).

5. (original) A method according to one the preceding claims, wherein step e) comprises decorrelating (121, 122) the digitised signal with a complex-conjugate pseudo-noise code sequence (112).

6. (original) A method according to one of the preceding claims, wherein an

early-late timing detection (102) is provided in the synchronisation stream.

7. (original) A method according to one of the preceding claims, wherein after step f) the real part (118, x) of the interference reduced complex signal (y) is determined (126).

8. (original) A method according to one of claims 1 to 6 wherein before step f) the real part (x) of the complex signal (116, y) is determined.

9. (original) A method according to one of the preceding claims wherein wherein after step f) the interference reduced signal (118, X) is filtered in a step g).

10. (original) A method according claim 9, wherein steps e), f) and g) provide code-tracking (101) of the digitised signal (111).

11. (original) A method according to claim 10, wherein the code-tracking (101) provides an estimated timing delay ($\tau_k^{(i)}$) of the signal component assigned signal path (i).

12. (original) A method according one of the preceding claims wherein prior to step f) the digitised signal (111) is distributed a first and second correlator (121, 122).

13. (original) A method according claim 12, wherein the digitised signal (111) is time-shifted prior feeding it to the second correlator (122) providing late and early estimates (113, 114) as output of the first and second correlator (121, 122) respectively.

14. (original) A method according to claim 13, wherein the early and late estimates are subtracted (124) yielding an intermediate signal (117).

15. (original) A method according to claim 14, wherein the intermediate signal (117) is multiplied with reconstructed transmitted symbols (115).

16. (original) A rake receiver (17) for processing an electromagnetic signal (10) being a superposition of signal components of different signal paths comprising

a plurality of receiver fingers (1, 2, ... N), wherein at least one of the receiver fingers (1, 2, ... N) is adapted to receive a signal component assigned to one of the signal paths (i) with i ∈ {1, 2, ... N},

a timing error detector (102) for estimating an of a delay ($\tau_k^{(i)}$) of the signal component of the assigned signal path (i) and

an interference reduction device (131) adapted to reduce the interference of least one other signal component (j) with j ≠ i and j ∈ {1,... N} with the said signal component of the assigned signal path (i).

17. (original) A rake receiver (17) according claim 16, wherein the interference reduction device (131) comprises an interference computation module (132) being adapted to receive complex path weights ($c_k^{(i)}$) and path delays ($\tau_k^{(i)}$, $\tau_k^{(j)}$)to compute an interference signal of at least one other signal component (j) with the said signal path of the assigned signal path (i).

18. (original) A rake receiver (17) according to claim 16 or 17 wherein the interference reduction device (131) is adapted to subtract (130) the interference signal of at least one other signal component (j) from the said signal component the assigned signal path (i).

19. (original) A rake receiver (17) according to one of the preceding device claims, comprising an A/D-converter (14) upstream of the receiver fingers (1,2 ... N), for digitizing the received signal (10, 13).

20. (original) A rake receiver (17) according to one of the preceding device claims, wherein the timing error detector (102) comprises an early-late gate timing error detector.

21. (original) A rake receiver (17) according to one of the preceding device

claims, wherein each receiver finger (1, 2,...N) comprises a loop filter (103).

22. (original) A rake receiver (17) according to claim 21, wherein each receiver finger (1, 2, ...N) comprises a code- tracking loop (101) comprising the timing error detector (102) and the loop filter (103).

23. (original) A rake receiver (17) according to claim 22 wherein the code-tracking loop (101) is adapted estimate a timing delay ($\tau_k^{(i)}$) of the signal component assigned signal path (i).

24. (original) A rake receiver according to one of the preceding device claims, wherein the timing error detector (102) is adapted to provide pseudo-noise (112) decorrelation (121, 122).

25. (original) A rake receiver (17) according to one of the preceding device claims, which is adapted for direct-sequence code-division multiple access communication.